Biogas production through co-digestion of palm oil mill effluent with cow manure

Abstract:

Palm oil mill effluent (POME) and cow manure (CM) are excellent substrates for biogas production. Biogas production potentials from POME and CM as a single substrate were extensively researched by many researchers. In this work, the biogas potentials from POME and CM as a single substrate as well as co-substrates were investigated. In addition, the effect of removal efficiencies of chemical oxygen demand (COD) and volatile solids (VS) towards biogas production and its methane content were also investigated. Batch anaerobic digesters used for the digestion were operated at ambient temperature (28oC to 34°C) for 21 days. The digesters were operated at different mixing ratios. Maximum cumulative biogas yield and its methane content were obtained as 1875ml and 61.13%, respectively in the mixture containing 70: 30 (POME: CM). Co-digestion of 70% POME + 30% CM improved the removal efficiency up to 75% (COD) and 68% (VS). Biogas yield from digesters D3, D4 and D5 were improved by 21%, 162% and 110% v/v using the codigestion as compared to the digestion of POME alone and 95%, 323% and 240% v/v as compared to the digestion of CM alone respectively. These results show that biogas and its methane content production can be enhanced efficiently through co-digestion process.